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(Review Article)

## **An Understanding of Rasa Dhatu as Described in Ayurveda in the Light of Modern Science**

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### **ABSTRACT**

*Ayurveda says that the origin of body is from anna. After proper metabolic process the food materials changes into anna-rasa or adhyarasa dhatu, which helps in the formation and nutrition of the other dhatus of the body. The main role for the formation of rasa and mala is agni, which resides in the stomach. Two types of rasa dhatu present in the body, one is sthaya dhatu and another is poshaka dhatu. Heart has been the main place of rasa dhatu. When rasa dhatu is functioning properly helps in the formation of other dhatus, nourishes the body and also improves skin texture. If rasa-dusti present either due to vriddhi (increase in quantity) or due to kshaya (decrease in quantity) of rasa dhatu then various diseases has been occurred.*

**Key Words:** Rasa dhatu, Agni, Rasa-vriddhi, Rasa-kshaya

### **INTRODUCTION**

According to ayurveda, “dosha dhatu mala mulam hi shariram”<sup>1</sup> it means doshas are the biological forces which work through the medium of dhatus and malas. Dhatus and malas are the structural units and the doshas are the energy forms. Hence the doshas are called as asrayees and dhatus called as asrayaas. “Sharira Dharanat Dhatvah” that is those which nourish and support the body are known as dhatu. Some author says that from the Ayurvedic point of view the origin of body is from anna (food substance that the people or animals eat or drink or that plants absorb to maintain life and growth). As per metabolism process, the food material which is taken, after digestion is divided into two parts – useful part and unuseful part. The unuseful parts are eliminated from the body in the form of sweat, urine and stool and useful parts is known as anna-rasa, or Adhya rasa, which helps in the formation and nutrition of the other dhatus of the body. Acharaya Sushruta explain that the shareera/body is the “pancha maha bhuta vikaara samudayatmakam”<sup>2</sup> –it means that the dosha, dhatus and malas contribute for the formation of different organs and tissue of the body. All these are made up of panchabhuta’s and hence are known as “pancha maha bhuta vikara”. Main bhuta of rasa dhatu is jala (ap) due to this predominance, rasa dhatu has tendency to circulate in whole body.

### **FORMATION OF RASADHATU**

In Ayurvedic point of view, the food substances which is composed of the five primordial elements, is of four type (masticable, potable, electuaries and eatables), contain six

rasa, posses either the two or the eight types of potencies and has many properties, when eaten, digested and metabolised property and later nutritious essence of food which is absorbed from intestine after digestion which is extremely fine, is called rasa<sup>3</sup>. So the main role for the formation of rasa and mala, is agni, which has resides in the stomach.

In Ayurveda the concept of agni is described in brief. There are three types of agni – namely jatharagni, bhutagni and dhatwagni. Aggravation or diminution of jatharagni results in aggravation or diminution of bhutagni and dhatwagni. Therefore by all means one has to protect jatharagni by consuming suitable dietetics and behavior because power of agni or normal condition of agni is responsible for strength, health, longevity and vital breath<sup>4</sup>. Liver which is main seat of bhutagni? As we earlier say that body is made up of pancha mahabhuta vikara and all the dravya present in the earth is panchabhautica. So material which we have taken in the form of food is also panchbhutica material. Because of presence of bhutagni, the proper digestion and metabolism of food material firstly occur in the liver. Modern science says that the liver is main organ for metabolism. As the food enters into the stomach and small intestine (carbohydrates/protein/fat) is degraded into small digestible particles due to presence of mainly pancreatic and stomach enzymes (which work as jatharagni as per Ayurveda). In small intestine absorption of water by diffusion, ions by active transport and the nutrients (glucose, amino acid, and lipid) via portal vein and through systemic circulation reaches up to the whole body tissue and muscles for

formation and growth. 80% of blood supply to the liver is through hepatic portal vein which brings directly deoxygenated blood (annarasa) from stomach, spleen, pancreas and intestine and blood from hepatic artery (20%) mixes with blood from portal vein in sinusoids. The hepatic cells obtain oxygen and nutrients from sinusoids. The substances synthesised by hepatic cells, the waste products and carbon dioxide are discharged into sinusoids, then through hepatic vein comes into inferior vena cava and into heart. Liver cells performs many vital metabolic and homeostatic functions as metabolism of carbohydrate, fat, vitamin, many hormones, storage function like glycogen, amino acid, iron, fatty acid; synthetic function as all plasma protein and other clotting, complements factors, haemopoietic function; bile secretion and also perform excretory function that is excretes cholesterol, bile pigments, heavy metals, toxins etc<sup>5</sup>. Here an important Ayurvedic statement also given in Charaka<sup>6</sup> i.e. “**kittam rasasha tu kapho**” because of cholesterol excretion by the liver cells. Hence rasa dhatus is the main dhatu which is directly formed from annarasa and contain all nutrients which are required for development of remaining dhatus of the body.

### RASA V/S TISSUE FLUID

Rasa or fluid present in the body contains 60-65% of water and 35-40% solids (organic and inorganic). According to Chakrapani<sup>7</sup>, “**Dwividho rasah sthayi poshakashcheti**” that means rasa dhatu is divided into two parts, one is static i.e sthayi dhatu like the tissue fluid and intestinal fluid and another is flowing i.e. poshaka dhatu just like plasma and lymph, which help the nutrients to reach the whole body tissue. Total water present in the body is about 40 litres. It is mainly divided into two parts; ICF (22 lit) contain large quantity of  $K^+$ ,  $Mg^{2+}$ ,  $PO_4^-$ ,  $SO_4^-$  and proteins and ECF (18 lit) contain large quantity of  $Na^+$ ,  $Cl^-$ ,  $HCO_3^-$ , glucose, fatty acid, oxygen. ECF again subdivided into five parts; Intestinal fluid and lymph (20%), Plasma (7.5%), Fluid in bones (7.5%), Fluid in dense connective tissue like cartilage (7.5%), and trans-cellular fluid (2.5%). Hence from above, we can conclude that rasa dhatu is very much similar to whole ECF, not only with lymph and plasma<sup>5</sup>.

### STHANA OF RASA DHATU – SEAT OF RASA DHATU

Heart has been the main place of rasa dhatu. It may be so because all the nutrients of anna (food) after metabolism are absorbed from intestine via portal vein and this reaches into heart. Then after purification of blood, oxygenated blood with nutrients circulates into the whole body via systemic circulation. Again deoxygenated blood comes back into and through veins and reaches the heart. This process remains continue like a chakra<sup>8</sup>. Sushruta says that rasa circulate into the body whole time i.e day and night which nourishes, develops, maintains and keeps the entire body functioning constantly<sup>9</sup>.

### RASA V/S HEALTH

Ayurveda<sup>10</sup> says that normal rasadhatus brings skin texture smooth and soft; person becomes full of happiness along with proper functioning of sensory faculties. Similarly the body fluid helps to maintain homeostasis, temperature of the body and nourish all body tissue by transport mechanism so its proper functioning is very necessary for characteristic form & texture of various body tissues. For example- in the

case of dehydration (i.e excessive loss of water from the body) causes signs like loss of skin turgor, mucosa become dry, extremities become cold and decrease in sweating etc.

### RASA V/S DISEASE

Acharyas described that the disease which are caused by the dusti of rasa are either due to vriddhi (increase in quantity) or due to kshaya (decrease in quantity) or avarana (obstruction) as in case of rasavrita vata. The symptoms which are described in the case of rasa vriddhi<sup>11,12</sup> are dyspepsia, nausea, laziness, flaccidity, dyspnoea, cough, narcolepsy are very much similar with symptoms occur in case of acidosis i.e.  $H^+$  ions increases in body (deep and rapid breathing, peripheral vasodilatation, increase intracranial pressure); or hyperkalaemia i.e  $K^+$  ions increases, in case of acidosis/severe hyperglycaemia/increased potassium diet (sign and symptoms are- cardiac arrhythmias, weakness, nausea, intestinal colic, diarrhoea, muscular irritability, flaccid paralysis); or hypercalcaemia i.e  $Ca^{2+}$  ions increases, in c/o hyperparathyroidism/increases vitamin D/thyrotoxicosis (sign and symptoms are- polydipsia, lethargy, anorexia, nausea, dyspepsia, drowsiness and impaired cognition); or in chronic liver diseases (as in cirrhosis- clinical features are- weakness, fatigue, muscle cramps, anorexia, nausea, vomiting) etc.

Similarly, the symptoms present due to rasa kshaya<sup>13,14,15</sup> are dryness of skin, exhaustion, dehydration, malaise & photophobia described in Ayurvedic texts are very much similar with symptoms of alkalosis i.e  $H^+$  ions decreases in the body (severe & prolonged vomiting, over breathing etc); hypokalaemia i.e  $K^+$  ions decreases (clinical features are- typically muscular weakness & associated tiredness, cardiac ventricular arrhythmias, polydipsia); hypocalcaemia i.e  $Ca^{2+}$  ions decreases in c/o hypothyroidism (symptoms are- tingling of hand & feet, tetany); hyponatremia associated with hypovolaemia (clinical features are- thirst, dizziness, weakness, dry mouth, postural hypotension, confusion); hypomagnesaemia i.e  $Mg^{2+}$  ions decreases (clinical features are- cardiac arrhythmias, tetany, hypertension) etc.

### RASAPRADOSHAJA VIKARA AND COMPLICATIONS (DISEASES AND COMPLICATIONS OF RASADHATU)

If kshaya or vriddhi of rasa dhatu is not soon brought into normal or equilibrium state then it produces rasaja vikara or other complications of diseases<sup>16</sup>. Diseases caused by the vitiation of rasadhatus are viz; disinclination for food, anorexia, disgeusia, ageusia, nausea, heaviness, drowsiness, fever with malaise, fainting, anaemia, obstruction of the channels of circulation, impotency, asthenia, emaciation, loss of the power of digestion and premature appearance of wrinkles and grey hairs<sup>17</sup>. These same clinical features are seen in case of chronic liver diseases as in liver metastasis and in cirrhosis (i.e. weakness, fatigue, muscle cramps, weight loss and nonspecific digestive symptoms such as anorexia, nausea, vomiting; jaundice, loss of libido, hair loss, hepatic encephalopathy etc). Similar clinical features are also present in case of pancreatitis and in pancreatic carcinoma. Obstruction of the channels of circulation due to the formation of occlusive thrombus at the site of rupture or erosion of an atheromatous plaque is the main causative factors for Myocardial infarction (clinical features are breathlessness, vomiting, nausea, pallor, syncope due to

hypotension etc). If the abnormal doshas enter into the rasadhatu then it create abnormality into the rasadhatu and causes symptoms as cracks and roughness of skin due to vata dosha, visphota due to pitta dosha, and stiffness and whitish discolouration of skin due to kapha dosha.

### IMPORTANCE OF RASA DHATU IN THE BODY

Thus, rasa is the main dhatu in the body which produce directly from annarasa and it is one of the vital tissues for the nourishment and development of body. Because of this remaining dhatus are formed, nourished and it helps for the overall development of the body. Many diseases occur in the body due to rasadusti. So the fluid present in the body, is rasayukta and this is main factor for the development & origin of diseases in the human body.

### CONCLUSION

Rasa is the primary important dhatu in the body which helps in the formation of other dhatus of the body. It circulates into the body whole time i.e day and night which nourishes, develops, maintains and keeps the entire body functioning constantly. Rasa dhatu is divided into two parts, one is static i.e sthaya dhatu like the tissue fluid and intestinal fluid and another is flowing i.e poshaka dhatu just like plasma and lymph, which help the nutrients to reach upto the whole body tissue. Total water present in the body is about 40 litres. It is mainly divided into two parts; ICF (22lit) and ECF (18 lit). The symptoms which are described in the case of rasa vriddhi are very much similar with symptoms occur in case of acidosis or hypercalcaemia or in chronic liver diseases. Symptoms of rasa kshaya are very much similar with symptoms of alkalosis or hypokalaemia or hypocalcaemia or hyponatremia or hypomagnesemia. Anaemia, atherosclerosis, impotency etc are the diseases manifest due to abnormal rasadhatu.

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